Eastern Indonesia-Agribusiness Development Opportunities

Stakeholder Consultation Workshop

Mango

Kuta, Bali, Indonesia

23 – 24th April, 2013

Australian Government
Australian Centre for International Agricultural Research

Australian Aid

Collins Higgins Consulting

Eastern Indonesia Agribusiness Development Opportunities (EI-ADO)

- Research commissioned by ACIAR, implemented by Collins Higgins Consulting and Indonesian partners
- EI-ADO project objectives:
  - Identify five commodity value chains linked to NTB, NTT and East Java with most potential to increase income of poor farmers
  - Identify opportunities and interventions with most potential for improving the efficiency, competitiveness and income of poor farmers
- Information and recommendations from EI-ADO study to inform DFAT in the design of the Australia Indonesia Partnership for Decentralisation – Rural Economic Development Program (AIPD-Rural).
  - $112 million DFAT funded development program targeting Eastern Indonesian

AIPD-Rural

- **Goal:** Increase the net income of 1 million poor male and female farmers by at least 30% by 2022 (300,000 of which should be reached by 2017)
- **Objective**: to increase the competitiveness of poor male and female farmers
- **Strategy:** To address the “systematic” constraints of the agricultural sectors that are important to the poor in selected districts
- **Outcomes**:
  - Improved farm practices
  - Increased access to input and markets
  - An improved sub-national business enabling environment
- Approach: Market Development or M4P

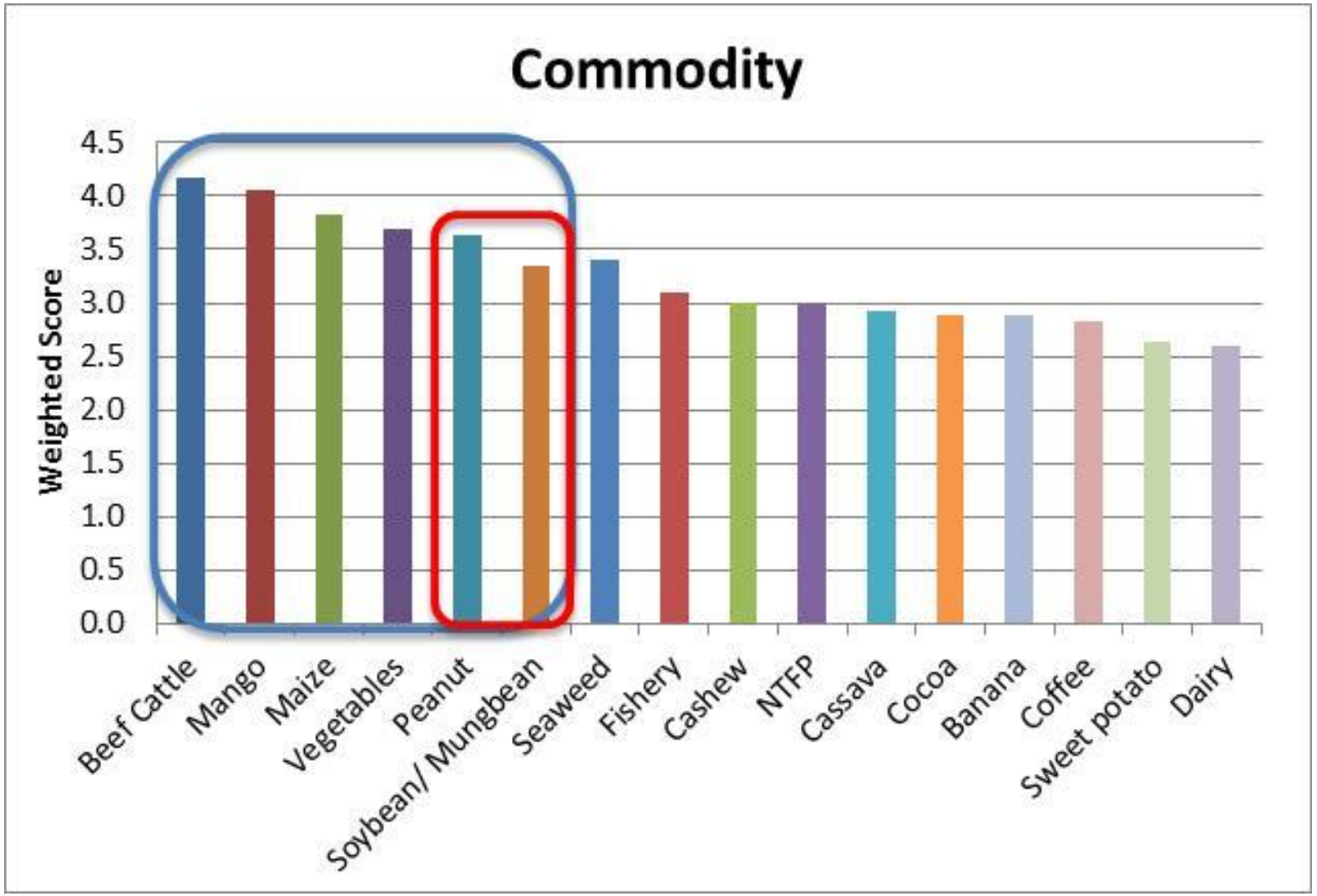
EI-ADO Methodology

- Initial identification of 32 commodities
- Reference Group selected down to 16 commodities
- 16 commodity literature reviews preformed
- Provincial and Reference Group consultation for commodity prioritization
- Identification of 5 priority commodities for detailed value chain studies.

1. Beef	
2. Legumes	Soybean, mungbean, peanut
3. Mango	
4. Maize	
5. Vegetables	Chilli, shallot, tomato & potato

Commodity Prioritisation

Commodities with most potential to increase income of the poor



Mango Presentation

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Project Approach

Mango study team:

- Tiago Wandschneider, International Value Chain Specialist/ Team Leader
- Ian Baker, International Commodity Specialist
- Ronnie Natawidjaja, National Value Chain Specialist
- Teddy Kristedi, Pak Gamal, Pak Harris and Pak Made

Project Approach

Areas Visited

- *Situbondo* (East Java) and *North Lombok* (NTB): selected for value chain research
- *Probolinggo*: develop a comparative perspective of production, processing, and marketing systems in East Java
- *Bandung* and *Cirebon* (West Java) and *Pemalang* (Central Java): interview exporters, supermarket suppliers, processors and input suppliers; gain insights into off-season production and marketing

Project Approach

- *Surabaya*: collect data and gain insights on the wholesale and retail stages of the chain
- *Jakarta:* develop an understanding of government policies and strategies, chain constraints and opportunities, spatial product flows

Project Approach

	Key Informants								
	Input suppliers	FGD	Prod.	Traders	Retail	Proc.	Research	Govt.	Total
Jakarta	1			4	2			1	8
Bogor							1		1
West Java									
Bandung				2		1			3
Cirebon	1		1	3		1			6
Central Java									
Pemalang	1	1	2	1					6
East Java									
Situbondo	2	3	5	5		1	1	1	18
Probollingo	1	1	4	3		2		1	12
Surabaya				7	6				13
Malang				1					1
NTB									
Mataram	1			4	2		3	1	12
N. Lombok	5	2	8	4			1		20
Total	**12**	**7**	**19**	**34**	**10**	**5**	**6**	**4**	**99**

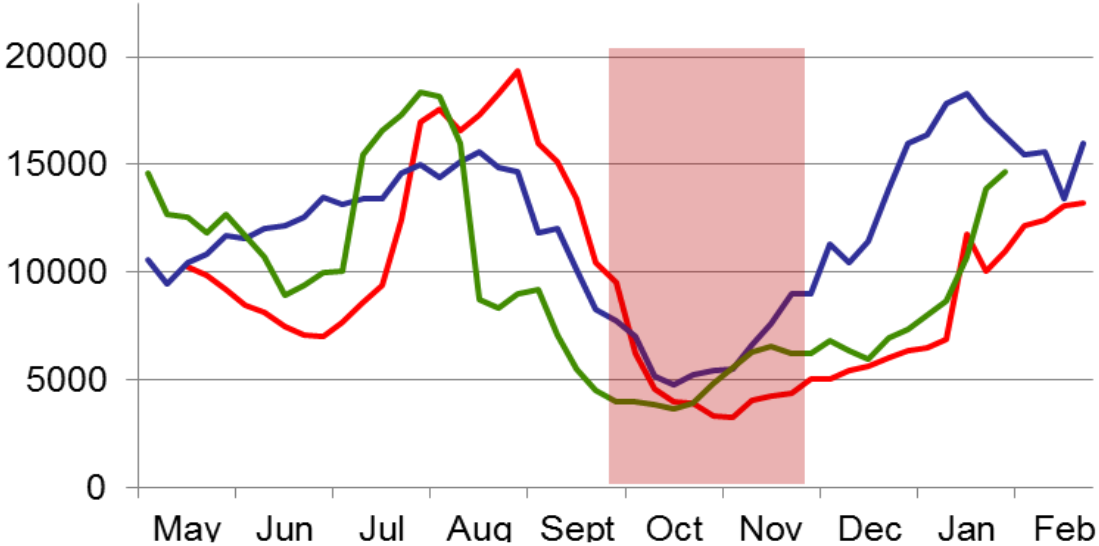
Key Findings

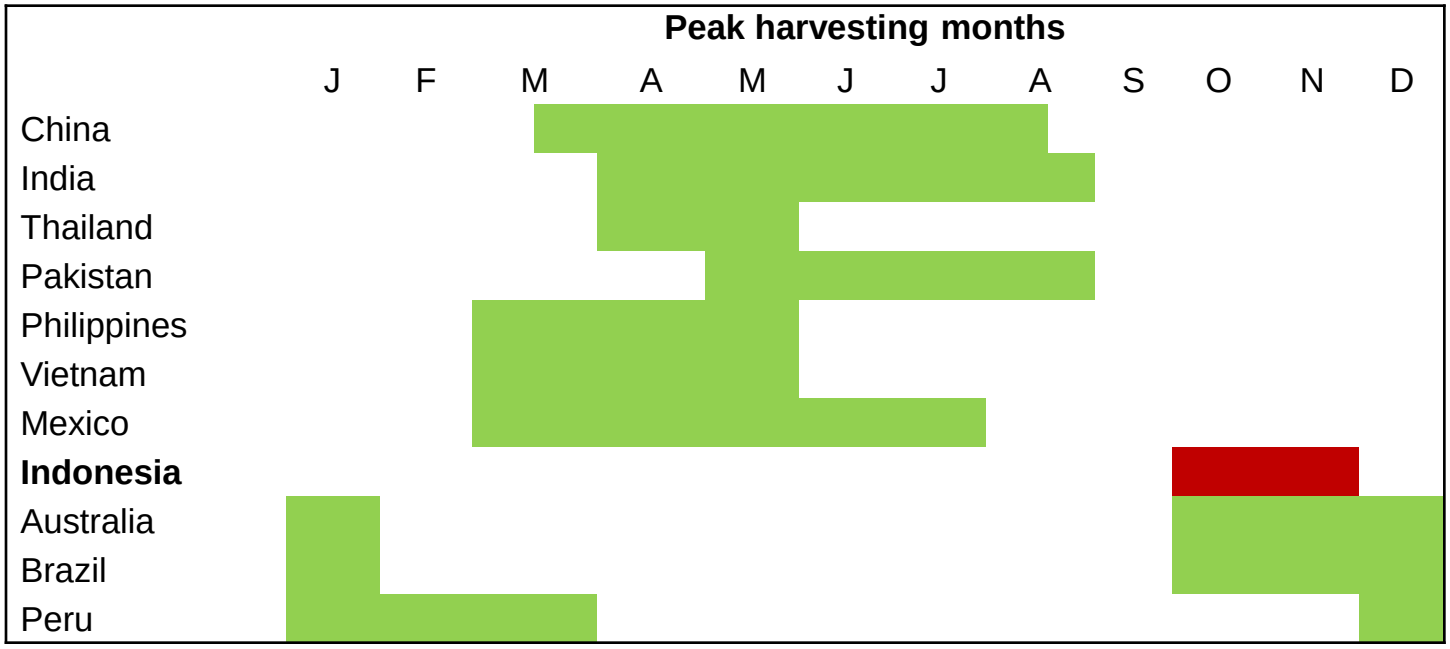
- Indonesia is the world's fifth/sixth largest mango producer

	2000	2005	2010	Share (%) 2010
World	24,852	31,665	37,125	100
India	10,504	11,830	15,027	40.5
China	3,211	4,250	4,351	11.7
Thailand	1,623	1,803	2,551	6.9
Pakistan	938	1,674	1,846	5
Mexico	1,559	1,679	1,633	4.4
Indonesia	**876**	**1,413**	**1,287**	**3.5**
Brazil	538	1,002	1,189	3.2

Key Findings

- Indonesia enjoys strong export fundamentals





Key Findings

- Indonesia has so far failed to take advantage of export opportunities:
  - Poor quality management systems at the farm-level and along the value chain
  - Consumers in export markets prefer yellow-skin varieties
  - Cheap sea freight is not an option because of poor post-harvest quality management systems at the export end

	Air freight ex-Jakarta (US$/tonne)	Sea freight ex-Surabaya (US$/tonne)
Singapore	700	45
Hong Kong	1,000	55
Dubai	1,700 - 2,000	100

Key Findings

	Mango Exports, 2000-2010			
	Volume (tonnes)	Value (US$)	Production (tonnes)	Share of production (%)
2000	430	402,000	876,027	0.05
2001	425	289,000	923,294	0.05
2002	1,573	2,672,000	1,402,910	0.11
2003	559	461,000	1,526,470	0.04
2004	1,880	2,013,000	1,437,670	0.13
2005	941	996,000	1,412,880	0.07
2006	1,182	1,161,000	1,622,000	0.07
2007	1,198	1,004,000	1,818,620	0.07
2008	1,908	1,646,000	2,105,090	0.09
2009	1,415	1,161,000	2,243,440	0.06
2010	999	1,065,000	1,827,290	0.06
Average	**1,137**	**1,170,000**	**1,563,245**	**0.07**

Key Findings

- Mango imports have risen, but are still very low and concentrated in the off-season months

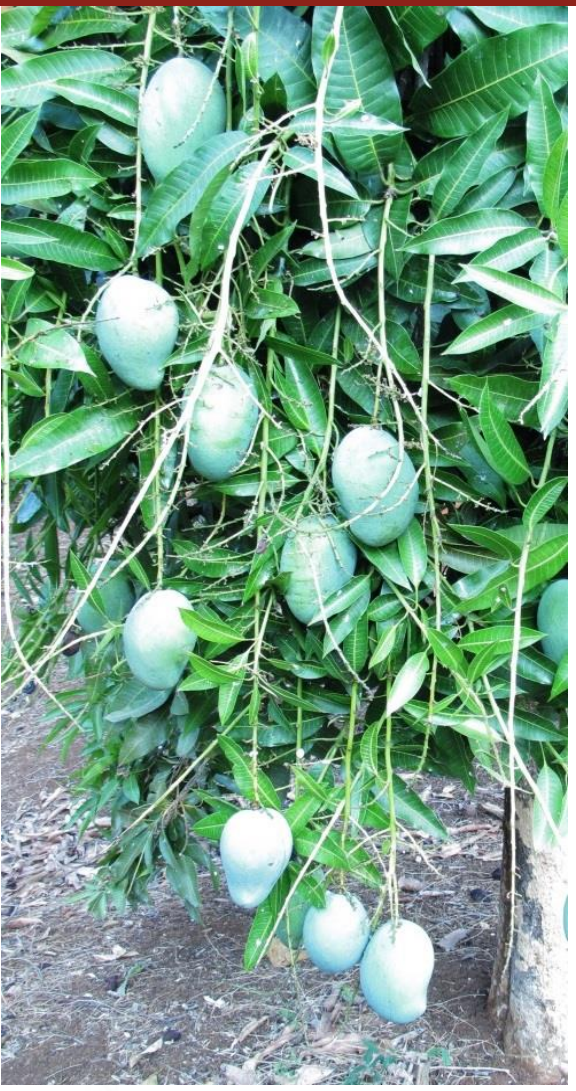
Year	Volume (tonnes)	Value (US$)
2000	64	95,000
2001	186	131,000
2002	254	172,000
2003	348	329,000
2004	689	446,000
2005	869	437,000
2006	966	627,000
2007	1,088	725,000
2008	969	604,000
2009	821	555,000
2010	1,129	817,000

Key Findings

- Mango production has been rising; Java accounts for 2/3 of national production

	2003	2005	2007	2009	2011	Share (%)	
						2003	2011
East Java	688,272	604,952	593,824	694,314	754,930	45.1	35
West Java	279,197	271,158	447,565	398,159	357,188	18.3	16.8
Central Java	195,046	193,687	263,507	423,452	350,780	12.8	16.5
S. Sulawesi	32,608	55,904	96,198	147,423	124,058	2.1	6.6
NTB	39,010	66,012	103,015	99,360	113,830	2.6	5.6
NTT	33,429	21,337	60,275	155,999	71,962	2.2	5.2
Bali	55,980	46,613	47,828	59,868	39,551	3.7	2.5
Other provinces	202,932	153,221	206,407	264,865	318,840	13.3	14.4
Indonesia	**1,526,474**	**1,412,884**	**1,818,619**	**2,243,440**	**2,131,139**	**100**	**100**

Key Findings



- The productivity of mango farms in Indonesia is high by international standards, despite relatively limited use of external inputs
  - Suitable agro-climatic conditions
  - Well-adapted, productive cultivars

Mango yields (tons/ha)	
Indonesia	~ 10
India	~ 8
Thailand	7-8
Philippines	~ 6

Key Findings

	Mango yields (tons/ha) in Indonesia			
	2009	2010	2011	Average 2009-11
East Java	8.9	9	9.9	9.3
Central Java	9.4	8.8	9.2	9.1
West Java	16.7	10.7	12.7	13.4
NTB	10.6	11.4	10.6	10.9
NTT	15.2	9.9	9.7	11.6
Indonesia	**10.4**	**9.8**	**10.2**	**10.1**

Key Findings

- The mango sub-sector is dominated by small farms

	Farm size (no. trees)		
	4-10	11-100	>100
		West Java and East Java	
% households	80	20	1
% trees	40	40	20
		NTB	
% households	28	60	12
% trees	4	47	49

Key Findings

- Harumanis is the dominant variety

Varieties	% of mango production			
	West Java		East Java	
	2002	2007	2002	2007
Harumanis	43	48	60	75
Gedong Gincu	20	28	0	0
Manalagi	3	3	6	8
Podang	n.a.	n.a.	9	10
Other (Indramayu, Golek, Madu, …)	34	22	25	7
Total	100	100	100	100

Key Findings

- Mango cultivation in Indonesia is undergoing a process of commercialisation, especially in west and central Java

Technologies	% of mango farms			
	West Java		East Java	
	2002	2007	2002	2007
Irrigation	25	45	8	10
Fertilizer, growth regulator, insecticide	18	35	3	7
Fertilizer and insecticide only	19	23	10	13
Fertilizer only	11	10	12	25
No chemical inputs	53	33	75	55

Key Findings

- Input use rates are particularly low in NTB

Technologies	% of mango farmers (2009)		
	West Java	East Java	NTB
Fertilizer	73	66	< 10
Growth regulator	30	25	1-5
Pesticides	41	37	n.a.

Key Findings

- High incidence of pests and diseases is the main production problem experienced by mango growers

Pests and diseases	Percentage of affected fruit (%), Bayan, North Lombok, 2010			
	June	August	October	December
	At harvest			
Flattids (sooty mould) (%)	55	13	60	0
Caterpillar (%)	54	40	38	15
Fruit borers (%)	21	0	0	9
	At ripening			
Anthracnose (%)	65	20	53	67
Stem end rot (%)	7	3	13	23
Fruit Fly (%)	9	0	0	20

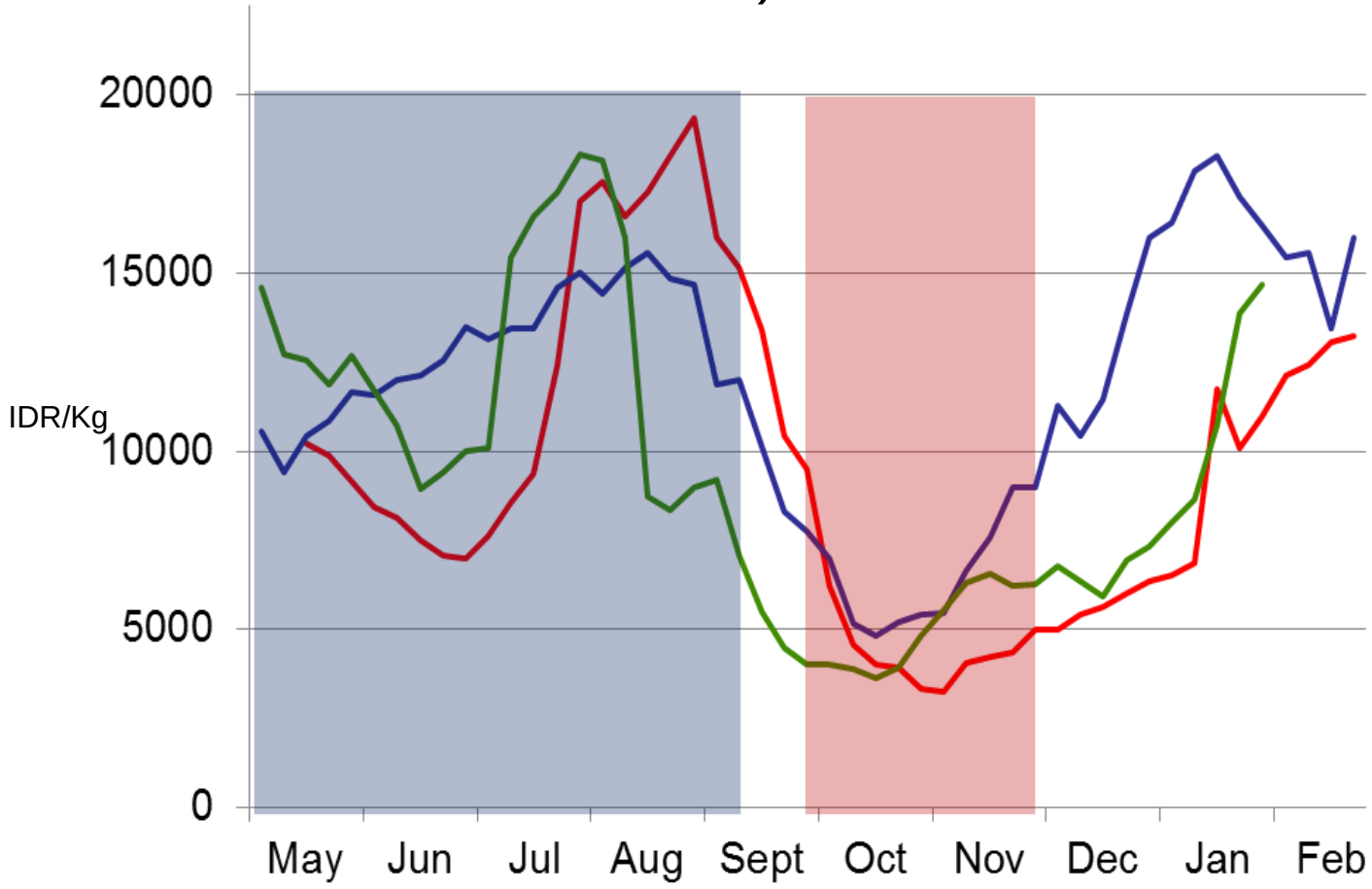
Key Findings

- Profitability of farms producing two harvests (incl. an early-season crop) is very high; profitability of farms producing one, main-season harvest is low

	Pemalang (N = 2)		Situbondo (N = 5)
Yield (tons/ha)	10.5	25	2 – 7.5
Price (weighted average, IDR/kg)	7,900	5,600	2,000 – 4,900
Revenue (million IDR/ha)	83	140	6 – 34
Cultivation, harvesting, and marketing costs (million IDR/ha)	21	18	4 – 13
Net income (million IDR/ha)	62	122	4.2 – 21
Returns on household labour ('000 IDR)	660	1,100	198 – 675

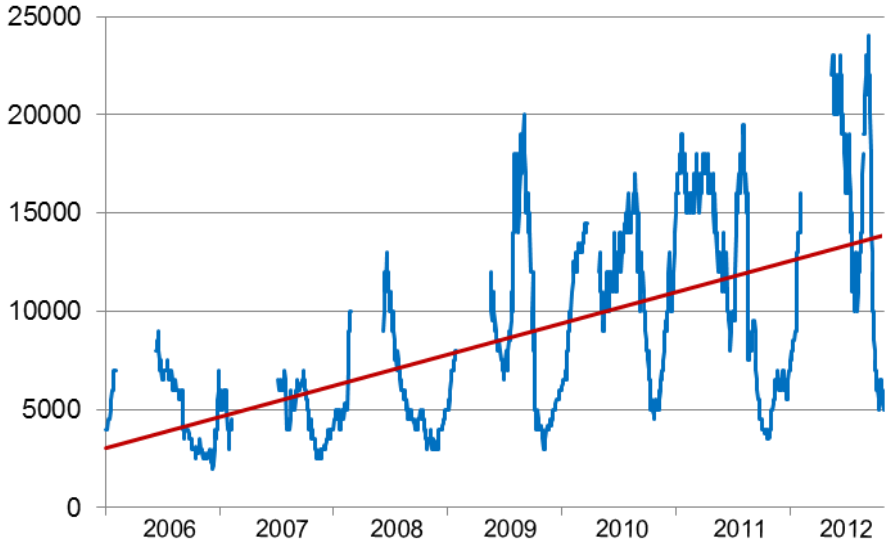
Key Findings

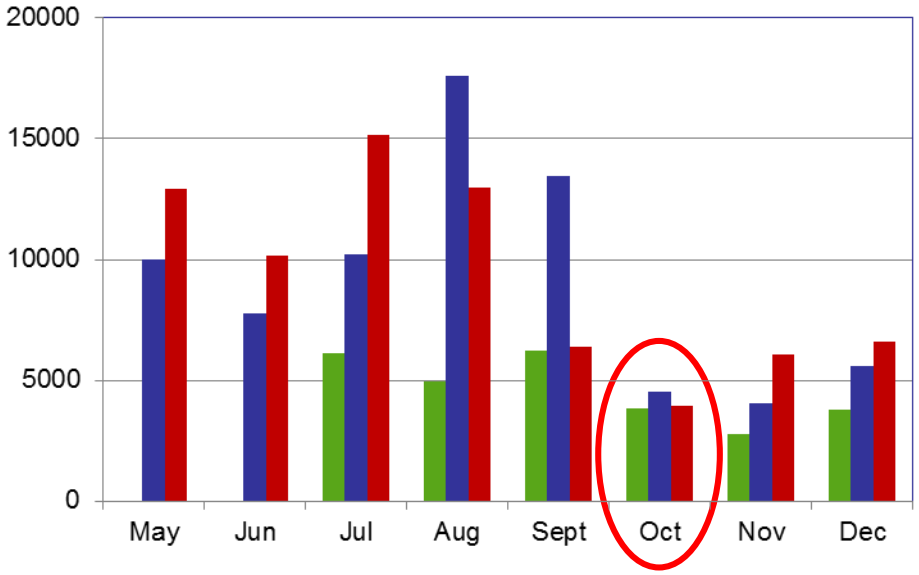
- During the Oct-Nov season, farmers fetch very low prices (this is the main issue of concern to them!)



Key Findings

- Off-season price trends are much more favourable than in-season price trends





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Key Findings

- High-input, off-season farms generate much more employment than low-input farms

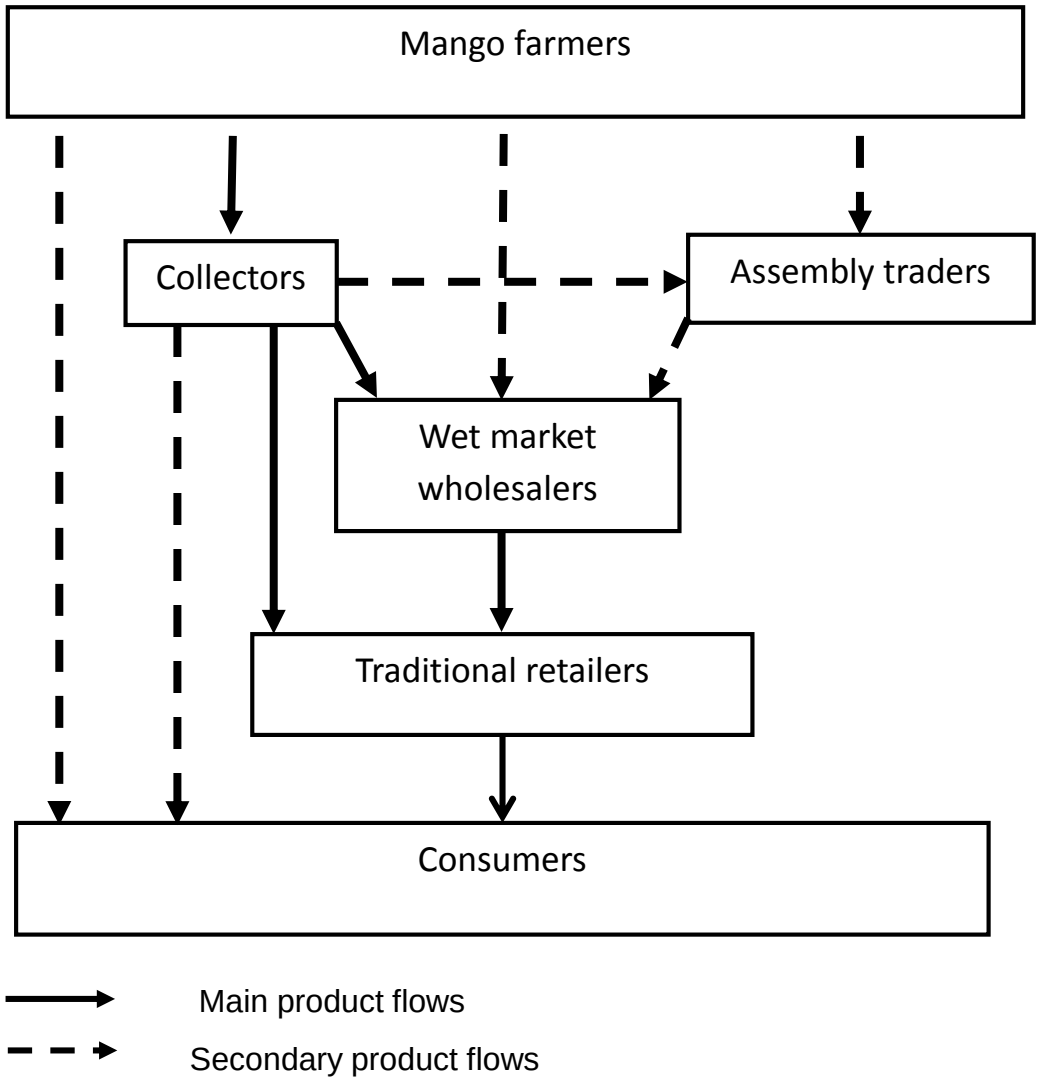
	Pemalang		Situbondo					Probolinggo	
	F1	F2	F3	F4	F5	F6	F7	F8	F9
Labour use per ha (No. person days)	220	247	235	185	49	23	47	132	88
Use of family labour per ha (No. person days)	95	107	60	65	21	10	8	24	12
Use of hired labour per ha (No. person days)	125	140	175	120	28	13	39	108	66
Wage income per ha ('000 IDR)	6,875	7,000	8,750	6,000	1,310	570	1,940	4,320	2,190

Key Findings

- The mango processing industry is still in its early infancy
  - Domestic demand for processed mango products is low
  - Competition from imports is high
  - Competition in international markets is high
  - Short harvesting seasons and finance are key constraints
  - Technical and marketing expertise is lacking
- It is very unlikely that mango processing will develop at scale over the next 10 years (which is required for tangible impacts on employment and prices), even with outside intervention

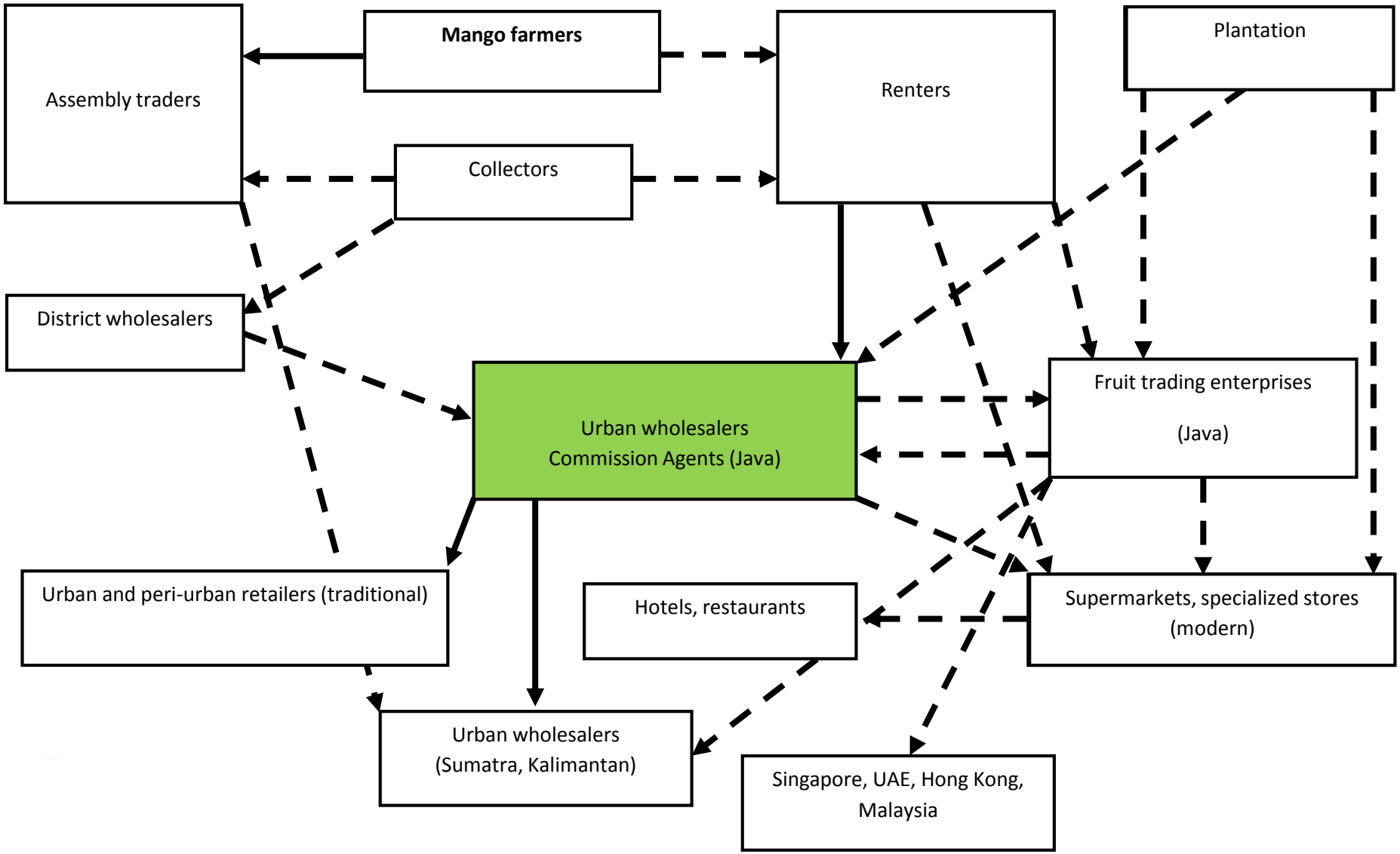
Key Findings

Simplified intra-district mango value chain in Situbondo



Key Findings

Simplified inter-regional, inter-island and export mango value chains, Situbondo



Key Findings

- Local chains offer limited opportunities for innovation, as they absorb small volumes of relatively low-quality fruit
- Upgrading of local production and marketing systems will have to be driven by developments in chains linking small farmers to urban or export markets

Key Findings

Production Level

- Situbondo has a dualistic production structure (many marginal and small growers; some large and very large renters)
- Sale of fruit on the tree is widespread, but many farmers also sell fruit after harvest
- Most farmers sell un-graded fruit
- Transactions are typically carried out by individual farmers, not groups

Key Findings

Assembly Level

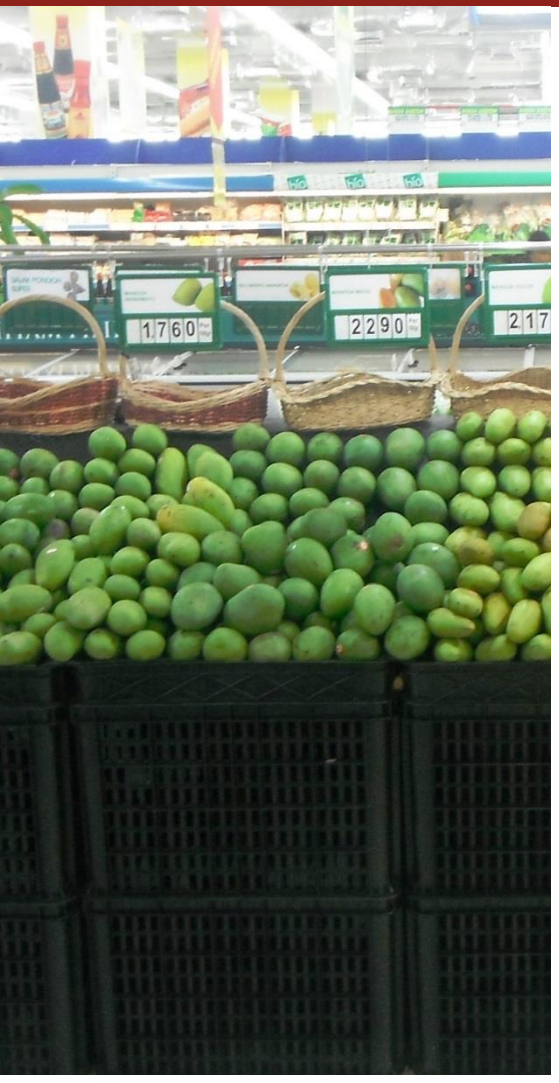
- Most mango is channelled to traditional wholesalers in urban markets outside the district and province (e.g. Jakarta, Bekasi, Bandung, Yogyakarta, Surabaya, Malang, Banjarmasin)
- Surabaya does not stand out as a destination market
- Local assembly traders have close relations with their buyers in urban wholesale markets

Key Findings

Wholesale Level

- Most mangoes are channelled to traditional retail markets, directly or indirectly, via secondary wholesalers, including in other islands, particularly Sumatra and Kalimantan

Key Findings



Retail Level

- Modern retail chains account for a very small share of the mango market (~ 5% of retail market in Java)
- Demand factors explaining the dominance of the traditional retail sector: price, culture/tradition
- Modern retailers are not active in the chain and do not invest in the upgrading of their suppliers
- These retailers hold significant power over suppliers

Key Findings

Financial Flows

- Wholesaling enterprises, both traditional and modern, provide most intra-chain financing
- Input credit and cash loans from local assembly traders to mango farmers are very limited

(research in 2 districts of WJ and 2 districts of EJ found that only 5% of small growers and 3% of marginal growers received input credit from buyers)

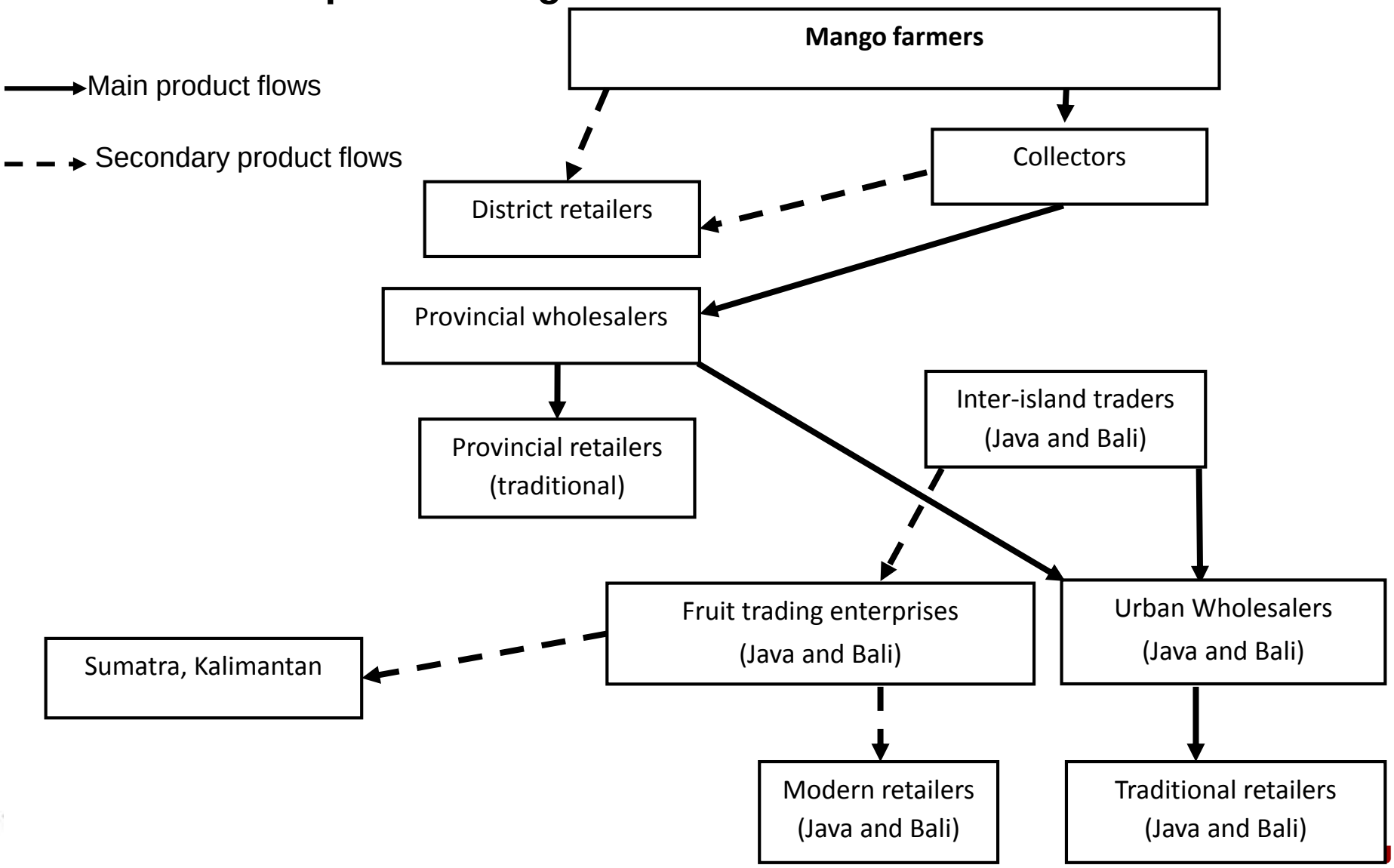
Key Findings

Knowledge Flows

- Knowledge flows along the chain are lacking
  - Chemical companies are not working with mango growers in Situbondo
  - Input dealers have no knowledge of mango cultivation
  - Local traders do not have much new knowledge they can pass on to farmers
  - Wholesalers are not a source of technical know-how
  - Local extension services in the mango sub-sector have limited resources

Key Findings

Simplified mango value chain in North Lombok



Key Findings

- Minimal input use (but inputs are available locally)
- Renting of trees and share-cropping are rare
- Mangoes are sold on the tree
- No credit or knowledge flowing from collectors to farmers
- Collectors may receive advances from and sell mainly to visiting inter-island traders from Bali and Java
- Collectors sell un-graded fruit to inter-island traders

Key Findings

Quality Standards and Management Systems

- Mangoes are graded by size (Super, A/B/C)
- There is significant price differentiation across grades
- But the vast majority of farmers sell un-graded fruit => incentives for quality (size)?

Grades	% of different grades in local production
Super A + A	40-60
B	20-40
C	10-30

Key Findings

- Quality management along domestic and export chains is poor
  (export chain > modern chains > traditional chains)
  - Skin marks, sooty mould, latex marks, compression and rub marks during transportation
- Still, post-harvest physical losses along the domestic and export chain are relatively “low” (<10%)
- Quality (and prices) in the traditional and the modern segments is variable

Key Findings

- Why are quality management systems so poor?
  - Consumer preferences and low ability/willingness to pay a premium for quality
  - Poor technical knowledge (e.g. simple procedures for controlling sap flow; post-harvest dip treatments for anthracnose, stem end rot, and fruit flies)
  - Fruit normally reaches the consumer within one week after leaving the farm; mango fruit has a longer shelf-life

Key Findings

Margins

	Traditional chain						Modern chain (Hero)				
	Selling price	Goss margin		Net marketing margin			Selling price	Goss margin		Net marketing margin	
	IDR/kg	IDR/kg	%	IDR/kg	%		IDR/kg	IDR/kg	%	IDR/kg	%
Farmers	1,250					Farmers	2,000				
Collectors	2,500	1,250	17.9	965	13.8	Collectors	2,500	500	5.6	215	2.4
Wholesalers	5,000	2,500	35.7	1,582	22.6	Supermarket supplier	6,000	3,500	38.9	2,498	27.8
Retailers	7,000	2,000	28.6	1,705	24.4	Supermarket	9,000	3,000	33.3	1,945	21.6

Key Findings

Key Chain Constraints

- *Poor technical know-how* at the farmer and export levels were identified as the most critical barrier to innovation in mango value chains, e.g.
  - Addressing knowledge gaps for successful crop manipulation would enable many farmers to develop off-season production (and to manage pests and diseases more effectively)
  - Addressing knowledge gaps by exporters in the post-harvest sphere could enable a shift to sea freight, which could in turn drive export growth.

Key Findings

Key Chain Constraints

- Many *farmers* face acute financial constraints and therefore have limited ability to take risks (innovate)
- *Exporters* face a series of constraints other than poor knowledge of post-harvest technologies
  - Fruit quality
  - Lack of business networks in new markets
  - Lack of market access protocols (e.g. China)
  - Variety

Key Findings

Key Chain Constraints

- *Processors* also face numerous constraints:
  - Short peak harvest season
  - Limited domestic demand for processed mango
  - Strong competition from imports
  - Strong competition in international markets
  - Poor product development expertise
  - Financial constraints

General Questions

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Income Impact Matrix – Criteria

1. Potential to increase income of households

Consider

- What is the technical feasibility of this intervention to increase prices, yields or reduce cost of production for individual poor farmers, traders, wholesalers and retailers?
- What is the potential for this intervention to contribute to the AIPD-Rural goal of increasing household income by 30%?

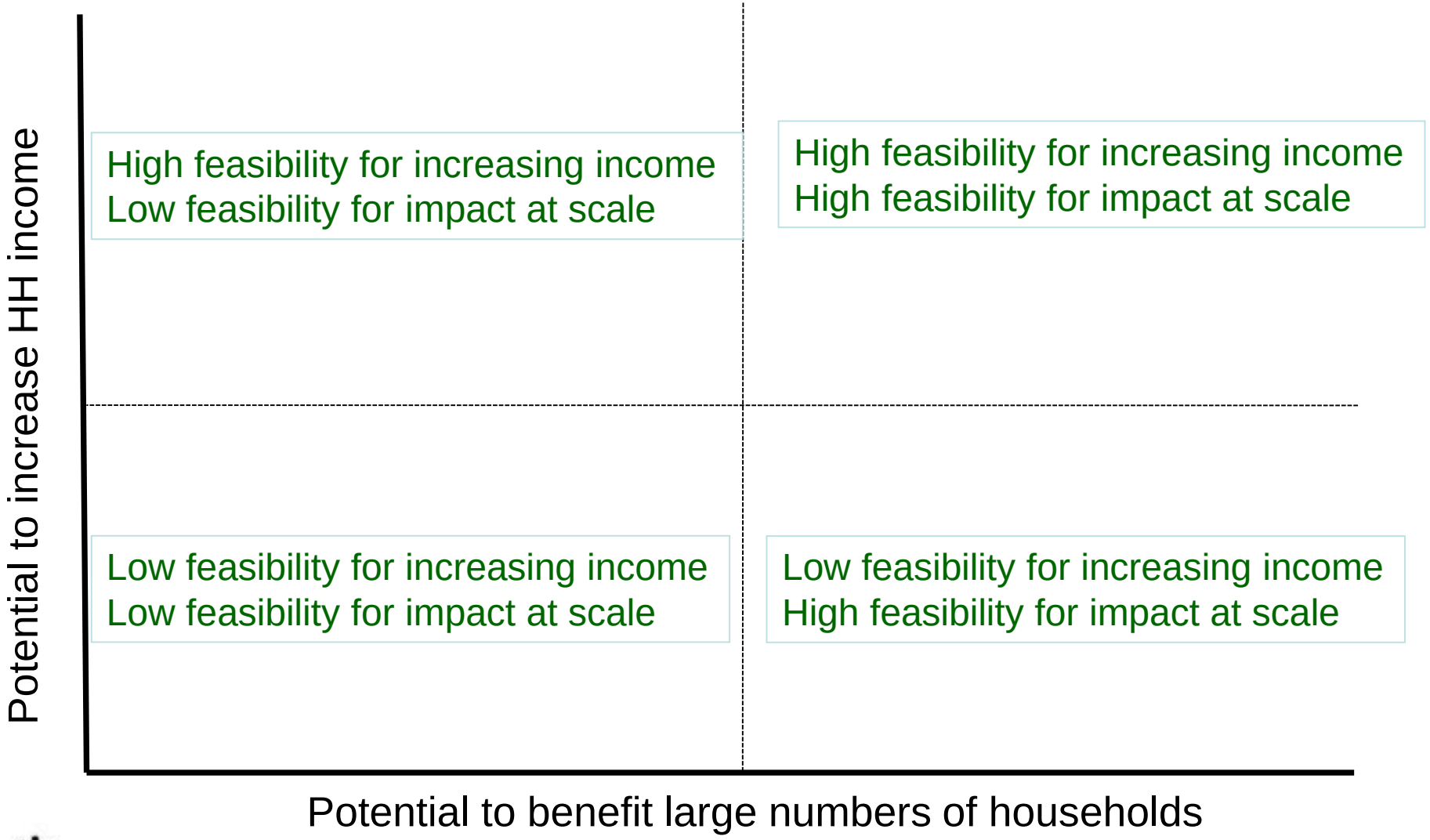
Income Impact Matrix – Criteria

2. Potential to implement, scale up and benefit large numbers of poor households

Consider

- What is the feasibility of implementing and scaling out this intervention, so that it will benefit a large number of farmers and poor households over the long term?
- What is the potential for this intervention to contribute to the AIPD-Rural goal of benefiting 300,000 households by 2017?

Income Impact Matrix – facilitated discussion



Proposed Interventions

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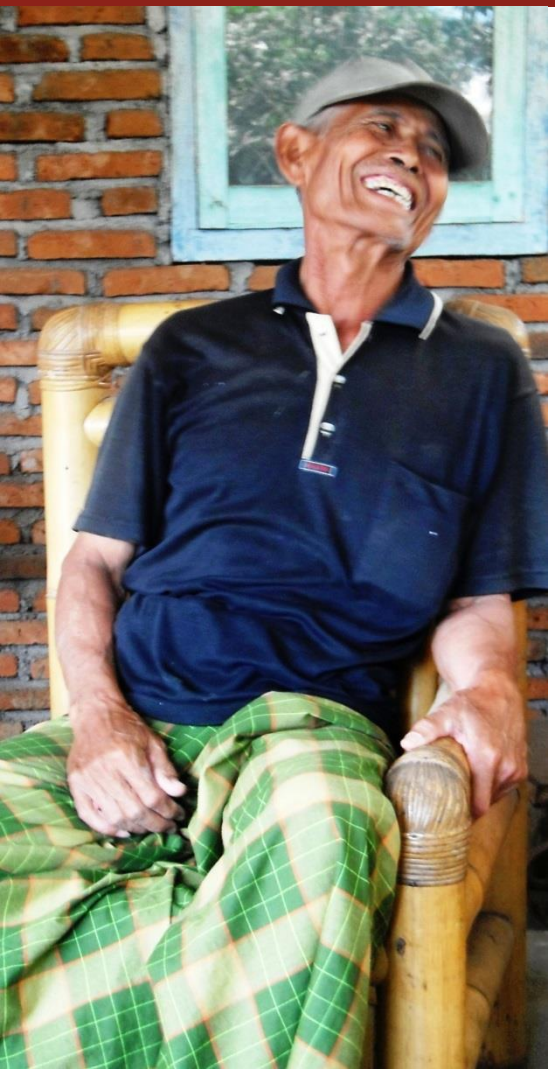
Intervention 1: Enabling off-season cultivation



Enabling off-season cultivation

- Most clear opportunity to increase the income of mango growers; a first step towards intensification and investment in quality at the farm level
- AIPD should focus on addressing knowledge constraints:
  - large, multi-annual programme of iterative and participatory demo-trials with strong input from researchers
  - Exchange visits (Cirebon, Pemalang, …)
  - Information products

Intervention 1

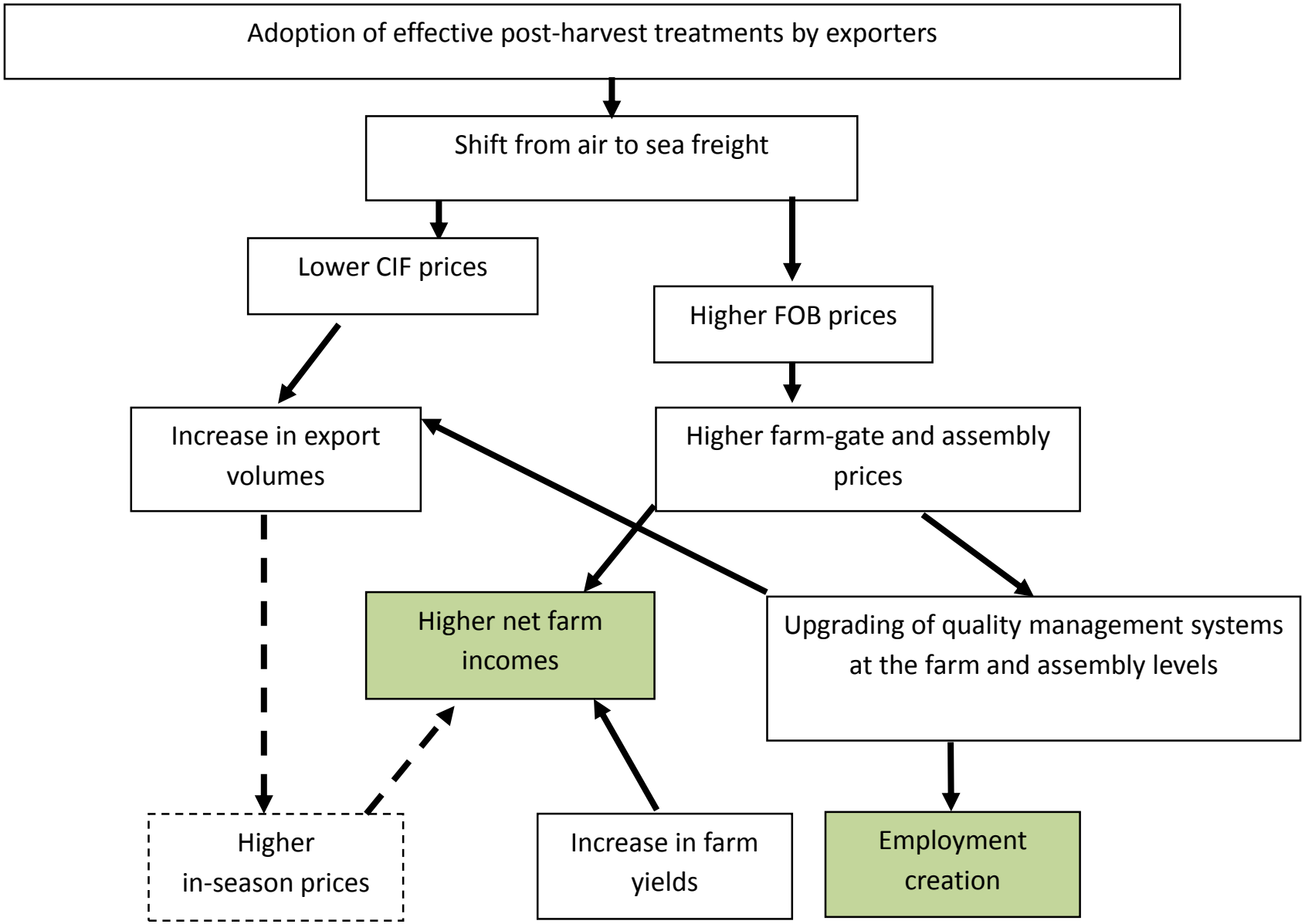
- It is recommended that AIPD targets farmers that manage 20-100 trees
- Smaller farmers may be involved at a stage when off-season technologies have been successfully demonstrated and adopted
- Large renters should not be actively targeted: trickle- down effects will be limited

Intervention 1

Potential Solution Providers

- Technical experts (researchers) working with:
  - Farmers
  - Extension officers
  - Chemical companies

Impact Logic: Improve Post Harvest Technologies Export



Intervention 1

Possible Impacts

Estimated average net income per tree for seasonal and off-season growers

	In-season cultivation	Off-season cultivation (Paclobutrazol + Amistartop)		
		Early season	Main season	Two seasons
Yield (kgs/tree)	70	25	55	85
Price (IDR/kg)	2,500	7,000	2,500	4,100
Revenue (IDR/tree)	150,000	175,000	137,500	312,500
Production costs (IDR/tree)	90,000	-	-	133,100
Net income (IDR/tree)	60,000	-	-	179,400

Intervention 1

Projected first-round net farm income impacts from early-season cultivation

	Additional annual farm income	
	IDR	USD*
1,000 ha (3,000 households)	19,250,000,000	1,964,286
Average per household (0.33 ha)	6,416,667	655

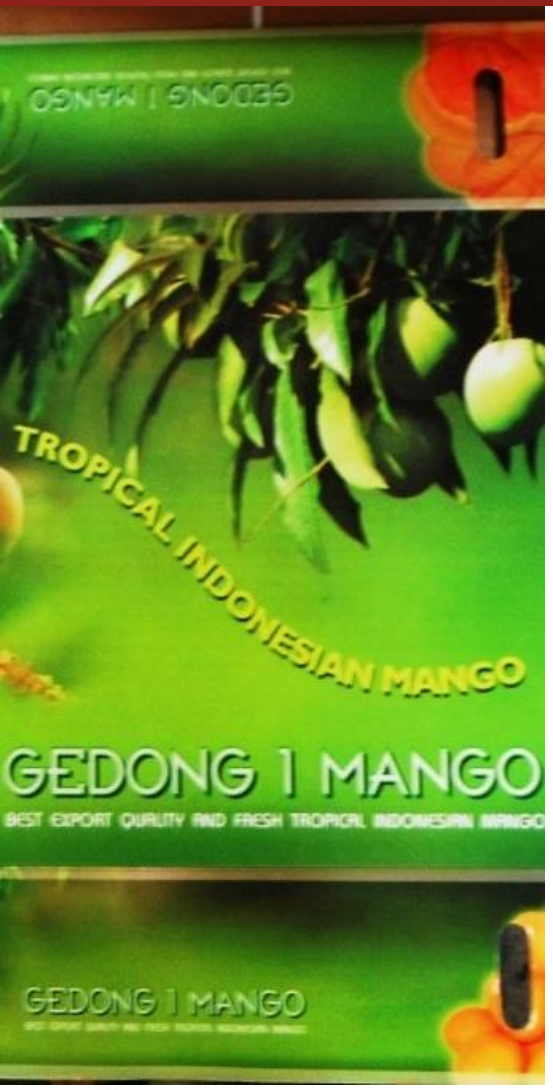
USD 1 = IDR 9,800

Intervention 1

Identified Risks / Weaknesses

- In large parts of North Lombok, acute fruit set failure will need to be researched and addressed before any intervention off-season innovations
- Intervention is knowledge intensive => strong expert participation is essential for success
- Chemical companies may not be willing to partner with AIPD… Is their participation essential?

Intervention 2: Enabling Export Development



Enabling Export Development

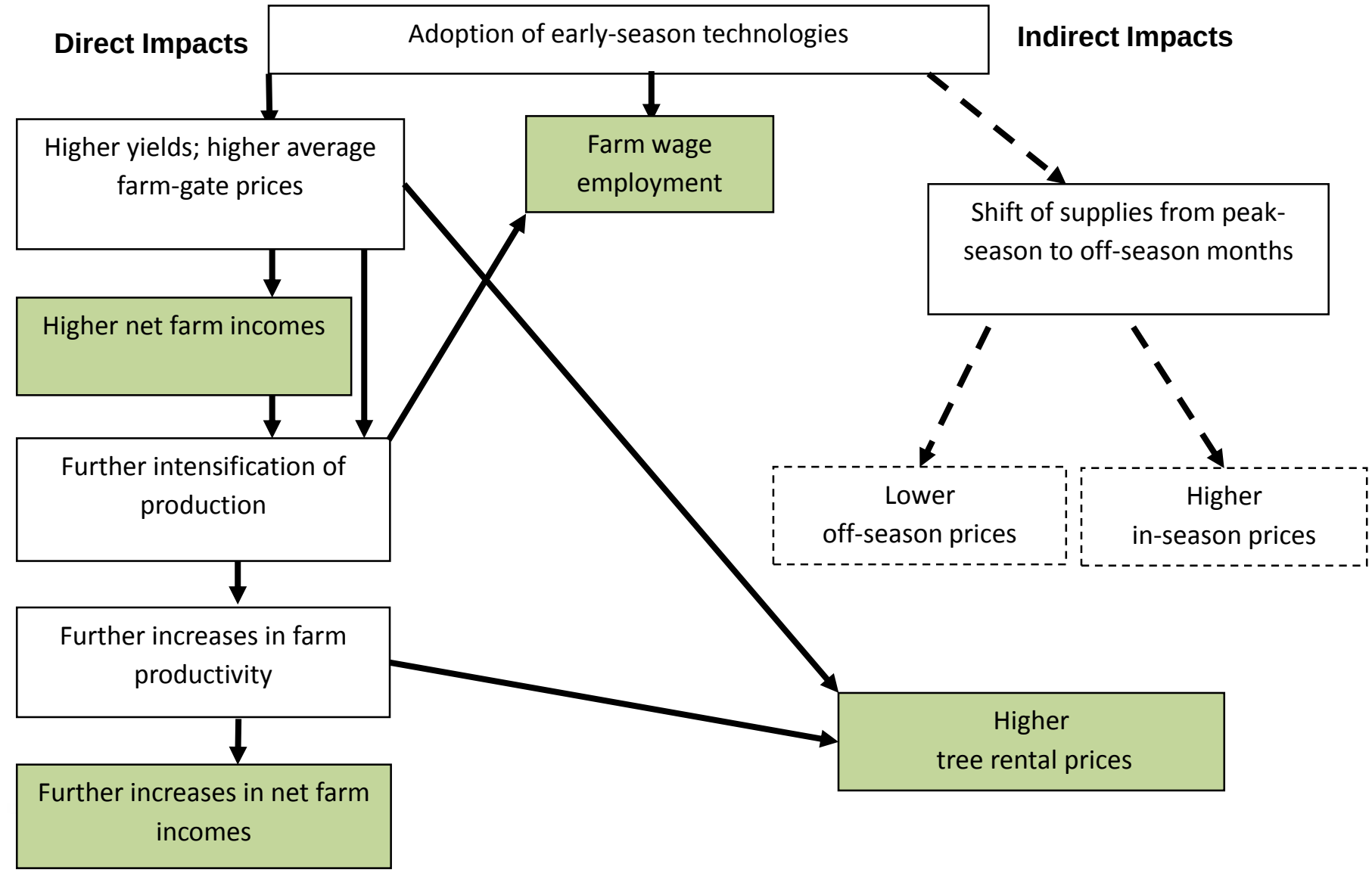
- AIPD can make a significant contribution to the development of the mango export industry in Indonesia
  - Transfer of appropriate post-harvest technologies
  - Coordination of participatory export trial shipments and export market visits
  - Sharing of initial risks associated with a transition to sea freight
  - Provision of strategic market research and information
  - Facilitation of business linkages with importers in current and potential markets

Intervention 2

Potential Solution Providers

- Experts (researchers) working with current and potential exporters, their suppliers, and farmers
- Importers and modern retail chains in import markets?

Impact Logic: Early Season Cultivation Technologies



Intervention 2

Identified Risks / Weaknesses

- The performance of Harumanis in long-distance sea freight has not yet been appropriately tested
- Consumer acceptance of Harumanis in export markets may be low due to skin colour (targeted promotions in collaboration with importers and modern retail chains could perhaps overcome this)
- Significant leakage of impacts to non-AIPD areas
- “Market linkage+” interventions are necessary to internalise outcomes and impacts

Intervention 3: Management of Pests and Diseases

Promoting improved management of pests and diseases

- AIPD could consider partnering with selected chemical companies to develop generic information products for wide distribution to farmers through input dealers
  - Pest and disease calendars
  - Charts showing fruit defects, as well as their causes and solutions, would be particularly useful to farmers and other chain actors.

Intervention 3

Potential Solution Providers

- Experts (researchers) working with chemical companies to develop appropriate information products
- Chemical companies as distributors of information materials
- Will chemical companies be interested to fund or co-fund the development and production of the materials?

Other Possible Interventions

- Support government in negotiation of export market access protocols! (ACIAR)
- Support varietal development programmes (ACIAR)
- Processing?
- Modern retail chains?

Gaps and Future Research

Gaps and Future Research (Varieties)

- Price trends for Harumanis *vs* Gedong Ginku
- Comparative analysis of the profitability of different varieties (e.g. Harumanis *versus* Gedong Ginku)
- Consumer acceptability of new varieties (e.g. Grafita) in Indonesia, as well as in current and potential export markets
- Tolerance of new varieties to post-harvest dip treatments

Gaps and Future Research

Gaps and Future Research (Farm Level)

- Fruit set failure in North Lombok
- Fine-tuning of off-season technologies to different agro-climatic and socio-economic contexts
- Cost-effectiveness and environmental impacts of different pest and disease control strategies (e.g. spraying *vs* bagging; spraying *vs* systemic insecticides)

Gaps and Future Research

Gaps and Future Research (Chain Level)

- Net margins along mango chains (export *vs* traditional *vs* modern; off-season *vs* in-season)
- Quantification of post harvest losses in long-distance trade (inter-provincial, inter-island) up to the retail end
- Willingness of “modern” mango trading enterprises to engage in value chain upgrading processes
- Identification of investors and enterprises who could partner with AIPD for development of mango processing

Gaps and Future Research

Gaps and Future Research (Export Level)

- Marketability of high-quality Harumanis mango in regional markets (e.g. Singapore, Malaysia, Hong Kong, Philippines, Thailand, Vietnam)
- Access barriers in regional markets (e.g. Philippines, Thailand, Vietnam)
- Technical feasibility of sea-freight shipments